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PRESENTATION TO

THE NATIONAL INDIAN BROTHERHOOD 8TH ANNUAL GENERAL ASSEMBLY

BY

PAUL FALKOWSKI
ENVIRONMENTAL AND OCCUPATIONAL HEALTH REPRESENTATIVE
UNITED STEEL WORKERS OF AMERICA

WINNIPEG, MANITOBA

14 SEPTEMBER 1977

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POLARPAM

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I an here today because we unfortunately share a common problem - the problem of unsafe environments. But not only do we share a common concern for environmental health, we very often also share the same opponents. Both the labour movement and the Indian movement have repeatedly been confronted with insensitive industries and foot-dragging governments when calling for environmental health reforms.

In many instances, governments and industries have refused to acknowledge the hazardous nature of environmental contaminants in spite of the fact that people working with the contaminants, or living off the polluted land, readily testified about the problem at hand. Even scientific evidence documenting the seriousness of a hazard does not necessarily move the authorities to act.

A case in point is the mercury pollution crisis in Northwestern Ontario. The federal and provincial governments have refused to heed the advice of the area's Indian leaders to close the mercury polluted Wabigoon-English-Winnipeg River system to all types of fishing. The governments have refused to act even though a government report over a year ago concluded: "Fish from the Wabigoon and lower English River system should not be used for human or animal food".

I can fully appreciate the frustration the leaders of White Dog and Grassy Narrows must feel when they see fishing guides from their communities consuming mercury contaminated fish as part of their job. We in the labour movement have long seen our members exposed to toxic substances and used as guinea pigs to see what level of poison our bodies can withstand before succumbing to disease and ruin.

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Years ago, coalminers brought canaries into the mines because canaries acted as an early-warning system for the miners. The birds would suffer the effects of deadly vapours sometimes found in coal mines before humans would. When a bird turned blue, keeled over, and died, the miners knew they'd better start scrambling back to the surface.

Today, many of our members continue to work in polluted environments. And many of your people, through no fault of their own, are forced to live on contaminated lands. In many ways, both groups are very much like the canaries the coal miners once carried underground to test the air. Our members unwillingly serve as modern day toxic-substance, early-warning systems. Governments and industries continue to allow our members to be exposed to toxic substances, continue to allow the conduction of human experiments, until the human carnage is so great a general ban is ordered. By then, of course, for our people it is much too late.

My concern and the concern of the union is about the work environment hazards that leave the plant gate. These hazards have a very nasty habit of getting into the general environment. Unfortunately, it is the Indian people who are the most severely affected when the general environment is contaminated. This is because the Indian way of life, and the Indian culture are intimately tied in with the environments about them. When the Indian environment is contaminated not only is Indian health threatened, but so is the Indian way of life and Indian culture as well.

My union has been greatly encouraged by the strong stands that the National Indian Brotherhood has taken in defence of the Indian environment across this country. We have had the opportunity to work with the Brotherhood in demanding environment clean-ups and our demands for environmental reforms have had more clout as a result. In Elliot Lake, Ontario, for example, the uranium miners we represent are dying at over three-and-one-half times the normal cancer death rate because of unsafe working environments.

The Serpent River Indian Band have been serverely affected by radiation pollution from those same mines. The entire Serpent River has been contaminated with radiation because the governments allowed the mines to thoughtlessly dump mine tailings in Elliot Lake area. The United Steel Workers in concert with the Serpent River Indian Band, and the National Indian Brotherhood, have been calling for a clean-up of the area.

The Steel Workers and the Brotherhood have also worked together to expose arsenic pollution in Yellowknife in the Northwest Territories. In a joint study, the University of Toronto, the United Steelworkers and the National Indian Brotherhood examined arsenic exposure in Yellowknife Indian children and Yellowknife Steelworkers. We compared our Yellowknife findings to a control group of Indian children and Steel Workers in Whitehorse. That study undermined a federal arsenic study of Yellowknife based on a volunteer sample. The government study somehow managed to miss Indian children and failed to use a control group. As you know, a public controversy erupted when the National Indian Brotherhood-Steel Worker study was made public, and the federal Minister of Health appointed the Canadian Public Health Association to investigate arsenic pollution in Yellowknife.

The National Indian Brotherhood and the United Steel Workers requested that the members of the arsenic Task Force be acceptable to all the parties in the controversy: the government, the industries, the unions, and the Indians. Neither the unions nor the Indians were consulted about the people appointed to the Task Force. We would not have approved of the people appointed if we had been consulted. Their track record on environment health matters was simply unacceptable. Our feelings on the matter were made abundantly clear to the Canadian government and the Canadian Public Health Association. As a result, the Canadian Public Health Association agreed to consider appointing a consultant to the arsenic Task Force who met our approval.

We submitted the name of Dr. Hector Blejer to the arsenic Task Force for their consideration. Dr. Blejer has extremely lengthy qualifications in the field of environmental health as well as an extensive amount of expertise regarding arsenic. In fact Dr. Blejer's work while at the National Institute of Occupational Safety and Health in the United States led to a re-evaluation of the arsenic standard in that country.

But when it became apparent that Dr. Blejer's view of arsenic exposure was much more serious than that of the Task Force, the Canadian Public Health Association failed to consult him. The arsenic task force went so far as to ignore Dr. Blejer while writing their Interim Report on the Yellowknife situation. They failed to consult him on the interpretation of the arsenic data and on his perceptions of the health risks for people living there.

Dr. Blejer has, therefore, written an evaluation of the Interim Report. We now have that evaluation. I must emphasize that Dr. Blejer has never been on our payroll nor has he ever been on the payroll of any Indian organization. His report is completely independent and documents his views as a "professional" in the field of occupational and environmental health.

On the very first page of his report Dr. Beljer observes that the Canadian Public Health Association Interim Report "appears to be understating the very real danger anyone exposed to arsenic has of contracting arsenic related diseases such as cancer."

Not a pleasant observation. He then states: "A properly conducted scientific study of the Yellowknife populations would undoubtedly uncover examples of the less immediate health problems coincident with even relatively low levels of arsenic exposure."

Dr. Blejer also has some unhappy conclusions to make about the health prospects for union members, especially those who worked in Yellowknife during the 1950's. Dr. Blejer states: "....some of them have likely developed, or will develop in the future, irreversible, chronic, toxic effects such as lung cancer,

skin cancer, and other arsenic related conditions. This was not pointed out by the Task Force."

He also has harsh words to say regarding the Task Force's conclusion that arsenic levels in Yellowknife are safe. Dr. Blejer points out: "No known scientific basis exists for making this statement. The statement on risk levels is in fact a value judgement on the part of the Task Force. The statement, if true, would mean that the Task Force, unlike any other group of scientists, has managed to find the 'no effect' level for a carcinogen."

He says:

> Arsenic exposure can produce cancers. Citizens in Yellowknife are clearly exposed to arsenic in their environment. There is no scientific evidence that there is a 'no effect' level for carcinogens. The chances are, therefore, greater for contracting cancer in Yellowknife than in a community not exposed to carcinogens such as arsenic.

Dr. Blejer also has some unsettling things to say about the children in Yellowknife who have been found to have high arsenic levels. As I pointed out earlier, Health and Welfare missed Indian children in their volunteer survey of the Yellowknife community. The Steel Worker-National Indian Brotherhood study found high arsenic levels in Yellowknife Indian children when compared to a control group children. Dr. Blejer observes:

> It should be further noted that the Task Force has observed that certain children have elevated arsenic levels. The chances of arsenic affecting children are probably greater than with adults since there is a longer time from the onset of exposure with children. Also children are in an active metabolic state, are more dynamic developmentally than adults, and the chances that children can be adversely affected by arsenic exposure, in a shorter time, are distinct.

I'll just read you one more section from Dr. Blejer's report because it has a great deal to say about how governments have carried out environmental health surveys in this country. Here's Dr. Blejer again:

> The study conducted by National Health and Welfare and Dr. Schafer merits a brief comment. It is readily apparent that the study carried out by the two internists and general practitioner was conducted without taking into consideration adequate epidemiological techniques. The study lacks the benefit of a proper bio-statistical design as evidenced by the fact that it was based on a volunteer sample and is therefore biased. No controls were employed in the study. Without proper selected controls it is difficult to accurately assess the significance, if any, of the Health and Welfare data. The study was of inadequate size. The study, at best, is a limited clinical survey whose findings concerning overt arsenical poisoning can in no way be generalized to the Yellowknife population.

I feel that Dr. Blejer's statements underline the problems we all face if we rely on governments to protect our environments. Government's main interest is self-preservation, not environmental health. And governments are quite willing to sweep an environmental disaster under the rug if it means saving face.

In conclusion I would like to thank the National Indian Brotherhood for joining forces with my union to expose and combat the problems in Yellowknife. As you know, there are many more Yellowknifes in this country. Our problems don't end in Yellowknife. Many, many reforms are needed. I would like to point out that the services of the United Steel Workers are open to Indian groups at any time when it comes to

fighting environmental health battles. I sincerely hope that we can continue co-operating in promoting the welfare of our respective members in these matters, and look forward to joining forces with the Indian movement once more to demand much needed environmental health improvements in Canada.

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FRONT COVER: Arctic Fox, one of many species of northern wildlife being studied by Arctic Gas. Detailed studies will help to define areas where construction and operation of the proposed natural gas pipeline might conflict with northern wildlife and the arctic environment and establish ways to avoid or minimize such conflict.

JUNE/1973

Introduction

The relationship between wildlife and its environment is seldom simple, often delicate and always changing. One change invariably leads to another, which may either benefit or adversely affect species. This is true in southern regions of Canada where ecological relationships are complex, favored as they are by a relatively mild climate and productive soil. The negative or harmful effects of one disturbance are often offset by adjustments in wildlife populations and changes in ecological relationships. In effect, the ecosystem is quite capable of absorbing change, of adapting — provided, of course, that Man isn't too demanding.

One of the most frequently cited characteristics of the Arctic is its simplicity. The climate is harsh. The land is not very productive. Animals are either there in abundance or they have migrated.

Little wonder, then, that environmental relationships in the Arctic are simple and direct. They are also easily disturbed. As any painter, composer or architect well knows, simplicity is one of the most difficult things to achieve, one of the easiest things to destroy. Disturbance of one component may be disastrous to the whole.

And nowhere is this more true than in the Arctic ecosystem. However, with appropriate precautions, environmental impacts can be limited, thereby preventing destruction of the natural system or any of its individual components.

Arctic wildlife and the northern environment is the subject of an exhaustive research program being conducted for Canadian Arctic Gas Study Limited and Alaskan Arctic Gas Study Company. The program is part of a feasibility study for a pipeline to transport natural gas from Alaska's North Slope and the Canadian Arctic to supply energy markets in Canada and the U.S.

The pipeline would touch lightly upon the vastness of the northern landscape. In the Yukon and Northwest Territories, it would occupy less than 40 square miles of a total area of 1.5 million square miles, relatively no more than a string of thread across the length of a football field.

The wildlife and environmental studies, which began in 1971, are being carried out for the study group by one of the largest and most experienced teams of biologists ever assembled in Canada. Their findings are being reviewed by the Environment Protection Board, an autonomous group of leading Canadian environmental authorities.

continued

The symbol you see on the cover of this brochure represents Canadian Arctic Gas Study Limited. It is our way of introducing and identifying ourselves.

Our symbol features a stylized version of the inukshuk set against the outline of a pipeline. The inukshuk — "in the likeness of man" — is a stone figure built by ancient Eskimos of the Arctic to mark routes travelled over sea and land. The inukshuk also was used to corral caribou, an important food resource to this day.

Inclusion of the inukshuk in our symbol is a recognition by Canadian Arctic Gas Study Limited of our responsibility to preserve the environment and cultural heritage of the Arctic while planning for utilization of the natural gas resources of the region to benefit all Canadians.

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Wildlife Studies

The purpose of these studies is to ensure that construction and operation of a natural gas pipeline system in the north will be undertaken in such a manner that there will be no intolerable disturbance of the natural environment or wildlife resources of the north.

Field researchers have compiled extensive baseline data on such things as population sizes, migration patterns, habitats and other wildlife characteristics in the Mackenzie Valley region, northern Yukon and northeastern Alaska. Research in 1973 will extend into northern Alberta.

In addition to the wildlife work, biologists and field researchers have also made extensive vegetation studies to seek out the best means of re-establishing vegetation over a buried pipeline. This will prevent alluvial erosion and minimize thermal erosion of the underlying permafrost.

The study group has invested $5 million to the end of 1972 in its wildlife and vegetation studies and several million dollars more are being spent in 1973. Last year alone, 55 biologists and technicians were involved in field work, in addition to those who are assessing the data obtained in the field. This brochure offers a comprehensive view of this vital aspect of the Arctic Gas research program ■

Birds, fish, caribou, grizzly bear, Dall sheep, fox, muskrat ..... Once they were sought with rod and gun, then the telephoto lens and now the clipboard. Field teams sponsored by the study group are gathering extensive data on all of them. The researchers' objective? To define any possible areas where construction and operation of the proposed natural gas pipeline might conflict with wildlife resources. Once that is done, they can then establish ways to avoid or reduce such conflict.

Studies have already produced reams of valuable data on northern wildlife resources. Two years ago, for example, one field party discovered that the Porcupine Caribou herd in the northern Yukon numbers some 70,000 — twice as many as previously estimated.

Tail-counting is but one of the researchers' activities. They are also taking a close look at how wildlife react to Man and machines. Pipeline construction and operation will introduce some new sounds to the north. So field teams are taking sets of sound simulation equipment into selected areas to see just how the animals react to the electronically simulated sound of a pipeline compressor station, for example. Or how a bush plane "flying" over a caribou herd at different elevations affects this valuable northern wildlife resource.

These and many other controlled experiments are being conducted with the co-operation of federal wildlife authorities, who will have access to the findings. An additional benefit of all the environmental studies is the accumulation of baseline information over a broad geographical area which will assist government authorities in future land use planning and management in these regions.

The vast wilderness of the Arctic region is one of the most significant areas for waterfowl production in North America. Moreover, ducks, geese and swans are particularly important to many northern communities and, thus, they are the subject of extensive study by Arctic Gas and its consultants. Other birds of interest to the researchers include several rare and endangered species, such as the falcon — especially the Peregrine Falcon. Preservation of animals' freedom and better government planning are but two of the benefits accruing from these studies. The people of the north have a very substantial economic, social and dietary stake in the region's wildlife resources. Therefore, our fur-bearer study will guide Arctic Gas in making decisions on location and timing of construction, and thus, help insure that those natives who wish to continue pursuing their traditional lifestyles will be able to do so ■

1. A biologist makes a close examination of a muskrat.
2. Low growing vegetation is abundant in arctic regions. This forms part of the insulating blanket that protects permafrost.
3. Old Crow, a Loucheux indian settlement on the banks of the Porcupine River, Northern Yukon, is the centre of caribou and mammal studies for Arctic Gas.

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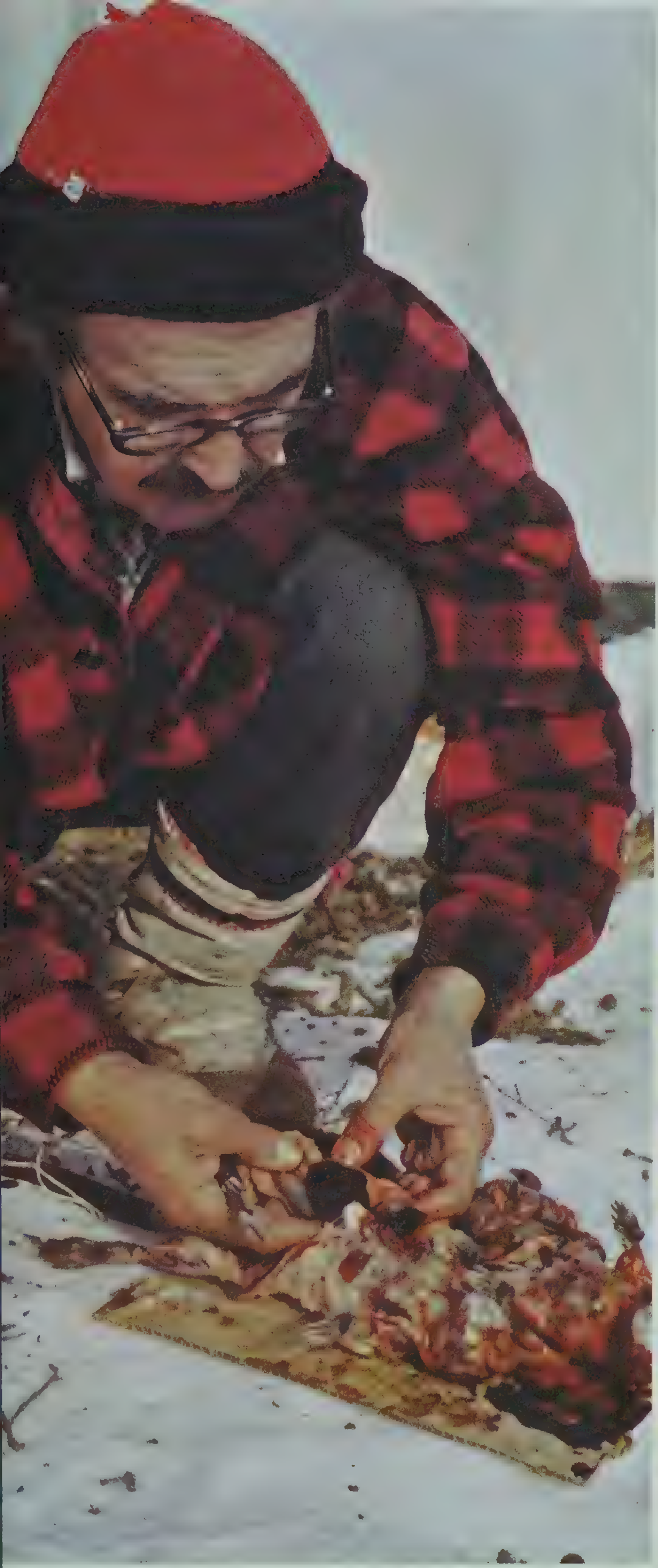

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Caribou and other Mammals

Located on the banks of the Porcupine River in the Northern Yukon, Old Crow is the centre of the Arctic Gas caribou studies in Northern Canada. Field researchers are studying a vast area from the Ogilvie Mountains in the central Yukon north to the Arctic coastline and from the Alaska-Yukon border east to the Richardson Mountains.

Barren Ground Caribou have been a vital food resource and an integral part of the culture of native peoples, particularly in the Old Crow region. Current research by Arctic Gas constitutes the first full-scale study of caribou in the northern Yukon. The specific objectives are to map the animal's winter ranges, migration activities and calving grounds; to measure the population; to assess native utilization of the herd; and to study caribou behavior patterns that might be affected by the construction and operation of a natural gas pipeline.

These caribou winter in the Porcupine Hills and the Ogilvie Mountains, south of the proposed pipeline routes. Since construction of the pipeline in the north would be limited to the winter months, careful timing will eliminate any impact on the herd's migration to its southern wintering grounds. Subsequent migration, of course, will not be disturbed since the pipeline will be fully buried and the active layer re-vegetated.

Muskrat is another species of Arctic wildlife that is part of the Old Crow camp's studies. The animal's fur is a source of income to the native populations. During the winter months, muskrat activity is easily observed, thanks to the "push-ups" — mounds of moss and snow that the muskrat forms as a source of air and winter food. In the fall, as the lakes begin to freeze, the muskrat maintains breathing holes in the ice by pushing moss and other vegetation to the surface.

Moose, Dall sheep, wolves, Arctic fox and grizzly bears are also included on the mammal study. Moose range over a wide area while Dall sheep are generally concentrated in herds of various sizes. Surprisingly large numbers of Barren Ground Grizzlies have been observed. Their dens are particularly sensitive areas; many of them have been used for centuries because suitable sites appear to be limited. Several dens in the northern Yukon have been recorded by field parties for the first time. These animals normally range widely but tend to be more concentrated during certain times of the year.

A key species on Alaska's North Slope is the Arctic fox. Den sites are especially important to their habitat and emphasis has been given to mapping them along or adjacent to the proposed pipeline routes. The largest concentration of Arctic fox dens and potential denning habitat in the northern Yukon is found near the mouths of the Firth and Malcolm rivers.

Field parties have been studying closely the wolf and its relationship with the caribou. They estimate that wolf population in the northern Yukon ranges between 300 and 400. Wolves are major predators of caribou and on several occasions attacks on herds were observed from the air and ground ■

1. An Arctic Fox cub.
2. Electro fishing is one method used in studying fish habitat, spawning grounds and migratory trends.
3. Repairing nets. Main objective of fish studies is to ascertain the fisheries resources of major streams and rivers which may be crossed by the pipeline, and to evaluate likely impact.

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Consultants to ..

Northern Engineering Services Limited,
CALGARY, Alberta
— prime engineering consultants, performing engineering and research

Battelle Memorial Institute,
COLUMBUS, Ohio
— perform metallurgical tests on pipeline materials
— provide guidance on fracture behavior of pipeline materials

Muskeg Research Institute,
FREDERICTON, New Brunswick
— assessment of potential maintenance problems within specific terrain and botanical analysis of terrain

Metallurgical Consultants Incorporated,
HOUSTON, Texas
— provide metallurgical expertise in the area of pipeline materials

J. D. Mollard & Associates,
REGINA, Saskatchewan
— aerial photography interpretation
— terrain typing and land form delineation

R. M. Hardy & Associates,
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Dr. D. L. Katz,
ANN ARBOUR, Michigan
— phase behavior of gases
— thermodynamics of chilling and cooling
— pipeline flow and compression

J. H. Schwartz & Associates,
CALGARY, Alberta
— advise on instrumentation and control systems for compressor stations

Caproco Corrosion Prevention Limited,
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— consultants on pipeline coatings and corrosion phenomena

Mr. G. L. Bartsch,
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— air transportation and navigational systems

Northwest Hydraulics Ltd.,
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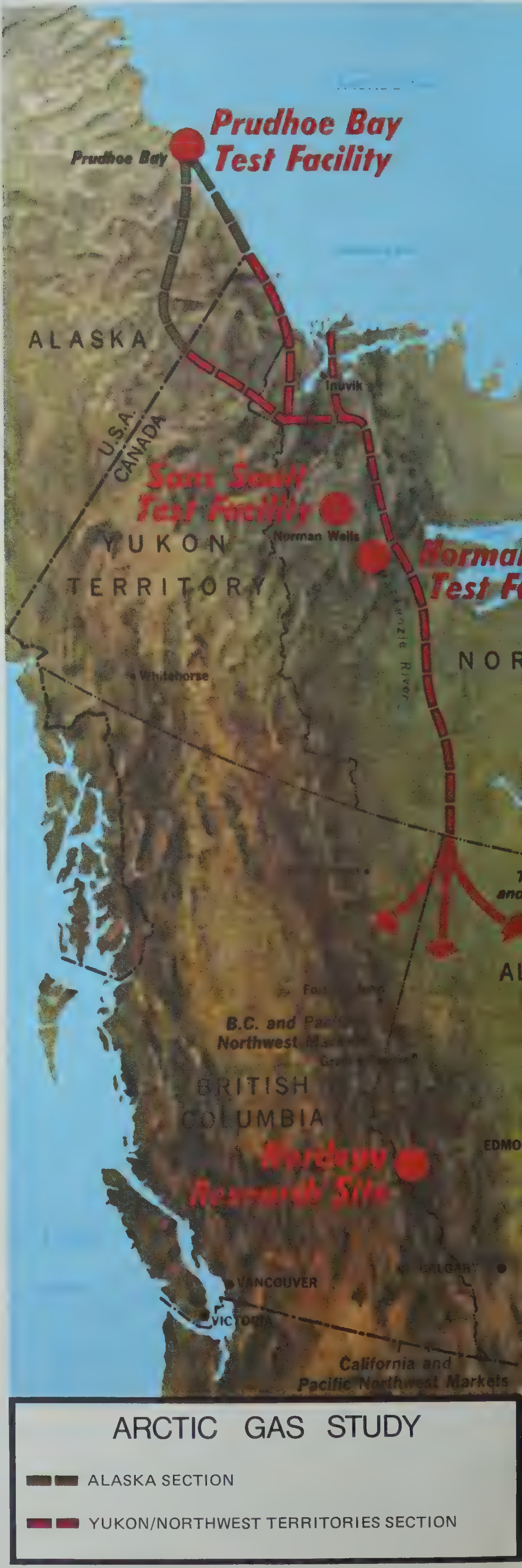

Arctic Gas

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OTTAWA, Ontario
— economic consultant

Mr. G. C. Watkins,
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— economic consultant

Boreal Institute For Northern Studies — University
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EDMONTON, Alberta
— sociological consultants, recruitment and training of northern residents

T. Blench & Associates,
EDMONTON, Alberta
— river hydrology studies

Gemini North
YELLOWKNIFE, N.W.T.
— economic and sociological consultants

E. W. Brooker & Associates,
EDMONTON, Alberta
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Canadian National Railway Company,
MONTREAL, Quebec
— transportation and logistics

ALASKA ONLY:
Pipeline Technologists Inc.
— Prudhoe Bay test site operators

R. & M. Engineering
— Alaskan geological surveys and soils testing program

Sam Peabody (EBASCO)
— cathodic protection and corrosion studies

C.C.C./H.O.K. & M.K.G.K.,
ANCHORAGE, Alaska
— economic and social impact study, Alaska.

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Fish and Birdlife

The main objectives of the fish studies are to evaluate the fisheries resources of major streams and rivers which may be crossed by the pipeline and to discover and evaluate areas of impact. For example, to what extent, if any, will water temperatures be affected by a buried pipeline? What impact will that have on fish?

Ornithological studies include surveys of bird populations, migrations, breeding and nesting grounds. Experiments have been conducted to determine the effect upon birds of human presence, construction activities and the operation of aircraft and compressor stations.

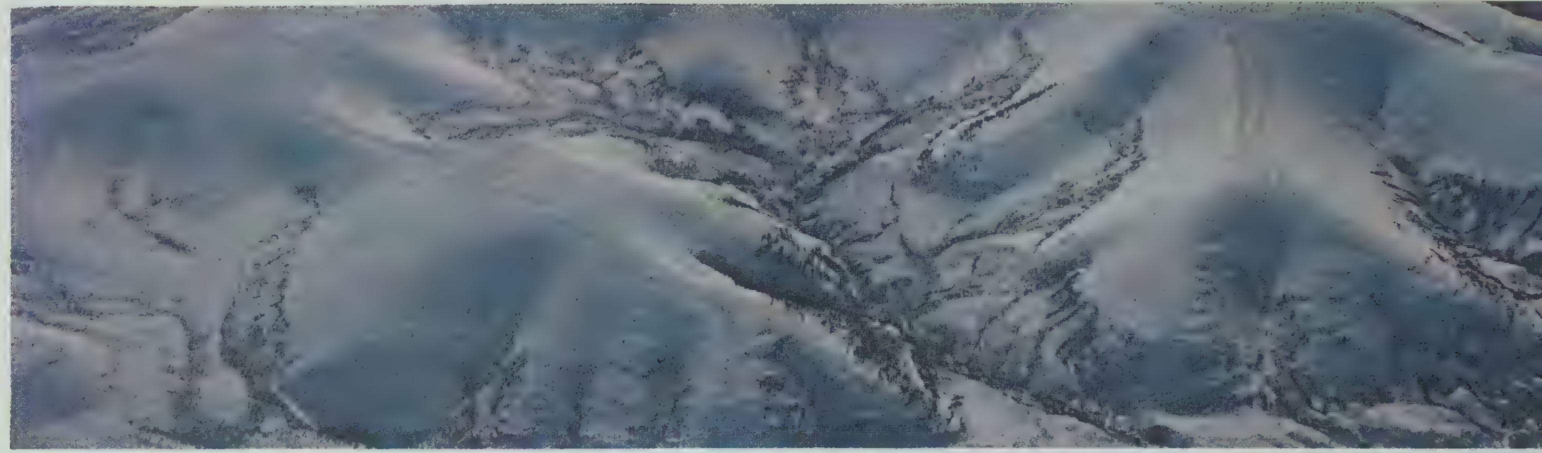
The centre for many of these studies in 1972 was Firth River, 10 miles inland from the Arctic Ocean south of Herschel Island. Studies ranged from the inventory of fish in streams, rivers and lakes to the impact of helicopters and planes on birds. Migration and the general movements of birds were studied and controlled experiments with sound simulation equipment were part of the camp's work.

The main thrust of the Firth River camp's efforts was the study of fish. Angling with barbless hooks and using nets, field teams tagged more than 600 fish in an attempt to determine migration patterns. They subsequently estimated that up to 100,000 Arctic Char make the annual run up the Firth River to spawning grounds. Native populations are finding that these fish can be sold at very handsome prices to gourmets all over the world. This is one economic opportunity that is just beginning to be exploited for the benefit of the Arctic ■

1. The Mackenzie Delta—Some of the difficult terrain which could be encountered along at least one of the proposed pipeline routes.
2. Spruce grouse is one of many species recorded during ornithological studies to determine populations, migrations, breeding and nesting grounds.
3. Arctic Gas' study constitutes the first full-scale study of barren ground caribou in the northern Yukon.

Alaska

Arctic Village is a community of 150 Indians at the foot of the Philip Smith Mountains on the banks of Alaska's Chandler River. Arctic Gas researchers and consultants set up camp there in 1972 for all of the wildlife and environmental studies in northern Alaska. These included research projects on caribou, fur-bearers, birds, fish and vegetation. Study projects in 1973 will concentrate on gathering more baseline data and conducting detailed "direct impact" studies ■



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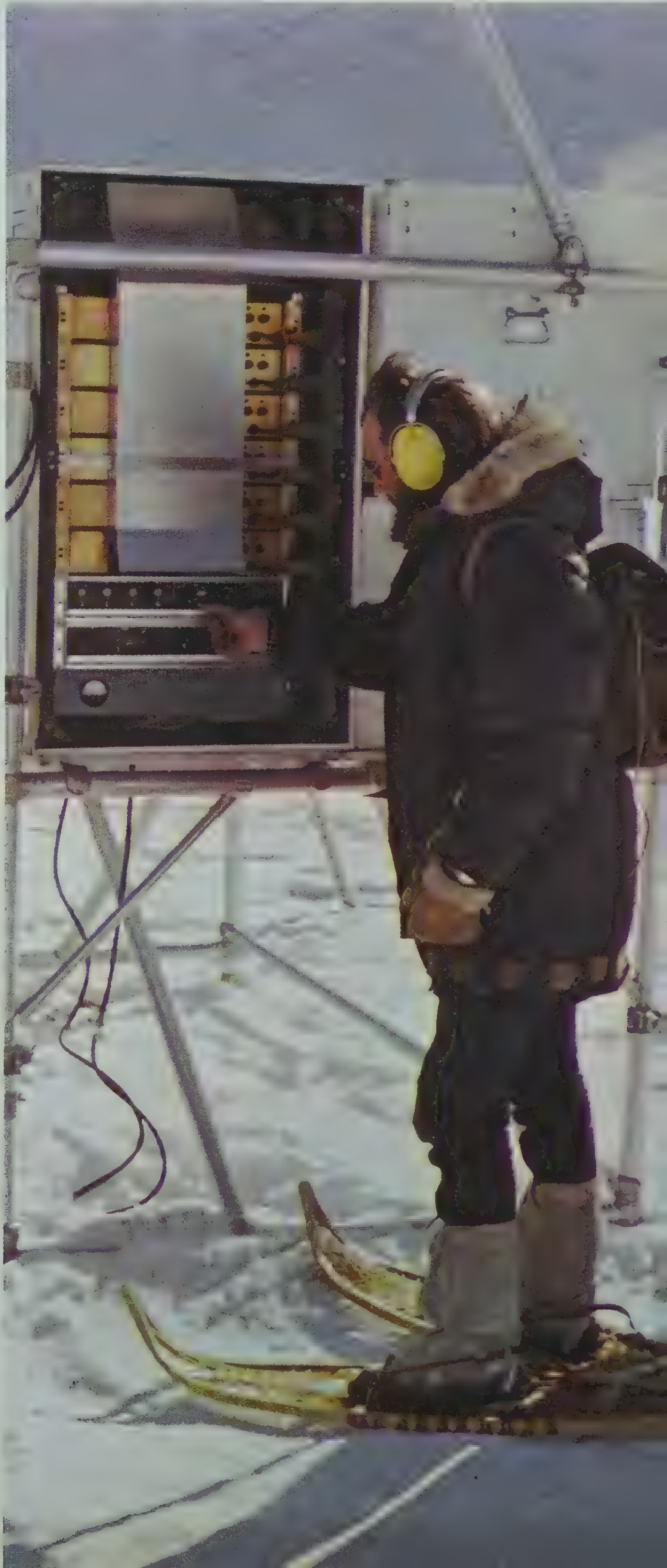

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Vegetative Studies

One of the major challenges facing Arctic Gas is to design a pipeline system which can be built and operated across the Arctic and sub-Arctic without damage to the permafrost.

Thawing of the permafrost under certain conditions can result in extensive environmental damage. In the case of a natural gas pipeline, the challenge can be met by controlling the construction, burying the pipe and chilling the gas to the temperature of the frozen soil and thereby preventing any thaw condition.

Approximately 1,000 miles of the proposed natural gas pipeline will run through permafrost country. This permanently frozen ground is the bedrock of the Arctic. It varies in thickness from a few feet to 2,000 feet and consists of gravel, sand, silt and other soils. The ice content ranges from zero to more than 80 percent, making the permafrost highly susceptible if thawing starts to take place. Ice lenses are numerous, some measuring up to 20 feet or more in thickness and covering areas as large as two or three city blocks.

The object of the vegetation studies is to show how to restore a vegetative cover as quickly as possible to all land surfaces disturbed by construction of the pipeline. This vegetation will prevent or minimize thermal and alluvial erosion, thereby protecting the permafrost. Experimental grass seeding and other revegetation studies have been conducted at the Arctic Gas pipeline test facilities located at Norman Wells and Sans Sault in the Northwest Territories and at Prudhoe Bay in Alaska. These tests have demonstrated that a natural gas pipeline can be built and operated in the Arctic without thawing the permafrost. Including both the construction and operation of the three test facilities for almost two years, Arctic Gas has spent more than $7 million on this phase of its study program.

During their extended operating period, the test facilities provided data on:

— stability of gas pipelines in permafrost under various simulated operating conditions;

— stability of different types of foundations for above-ground structures;

— the effects of a pipeline and pipeline construction on various forms of surface cover;

— drainage problems associated with Arctic pipeline construction; and

— construction methods, timing, material, and equipment for use in ultimate pipeline systems.

Operation of the test facilities has provided extensive data on the widest possible variety of soil, permafrost and other conditions which would be encountered in the construction and operation of a northern natural gas pipeline system ■

1. The unusual markings in this range of the Yukon's Ogilvie Mountains are in fact trails caused by migrating caribou.
2. Dall Sheep have been the subject of concentrated studies to determine how to avoid disturbance.
3. Sound simulation equipment helps field researchers observe the reactions of animals to the electronically simulated sound of a pipeline compressor station.

Environment Protection Board

The Environment Protection Board was established, in part, to recommend and review the wildlife and environmental studies, and to provide and make public an independent assessment of the environmental impact of the proposed pipeline system.

In its initial report, based on 1971 studies, the Board concluded that environment and ecological damage caused by construction and operation of a northern natural gas pipeline can be kept to acceptable levels, if necessary restraints are observed.

The Board's first interim report ('Towards an Environmental Assessment of a Gas Pipeline from Prudhoe Bay, Alaska, to Alberta') has been submitted to Arctic Gas, to government departments and to others having a special interest in this type of research. The report and its four volumes of appendices cover the Board's work to the end of 1971 on wildlife, fish, vegetation and revegetation. The Board has also published an interim report to cover its assessment of studies to the end of 1972.

The Environment Protection Board, an autonomous organization, is composed of leading Canadian authorities in the area of conservation and ecology. They include:

— C. H. Templeton, President, Templeton Engineering Co. (Chairman of the Board);

— N. J. Wilimovsky, Professor, Faculty of Graduate Studies & Institute of Animal Resource Ecology, University of British Columbia;

— Ian McTaggart-Cowan, Dean of Graduate Studies, University of British Columbia;

— L. Bliss, Professor of Botany, University of Alberta;

— M. E. Britton, Program Director, Ecology, Arctic Development and Environmental Program, Arctic Institute of North America;

— S. Thomson, Professor, Civil Engineering, University of Alberta;

— E. Gourdeau, Director of Man in the North Program, Arctic Institute of North America;

— D. C. Craik, President, Inter Disciplinary Systems; and

— R. C. Isaak, Secretary to the Board ■

Other study areas

Construction and operation of a northern natural gas pipeline would have far-reaching effects on Canada in many ways. What impact would it have on northern society? On the national economy? On Canada's ability to trade with other nations? On the supply of clean-burning natural gas to Canadians? How safe is the pipeline?

All of these questions must be answered, if Arctic Gas is to receive approval to build the pipeline. Arctic Gas is currently studying this wide variety of impacts. Detailed engineering work is being done on optimum pipe sizes, spacing and design of compressor and refrigeration facilities, metallurgical requirements, corrosion, communications, support facilities and many other aspects. The Arctic Gas proposal involves the largest engineering program ever conducted by the private sector.

Arctic Gas personnel and consultants are also conducting extensive terrain programs, which involve studying topographic maps and aerial photographs in black and white, colored and infrared. Specially-designed Geomet stations have been installed in 10 northern locations along possible pipeline routes. These stations provide continuous and automatic temperature recordings at the surface and at one-foot depths down to 20 feet below the surface. Cores have been drilled at the sites to provide additional terrain information.

The resulting massive volumes of data have been used by the engineers in preparing pipeline route studies, leading up to specific route proposals ■

Northern Employment

Recruitment, training and employment of northern residents has a high priority in the planning and operation of Arctic Gas.

Construction of the proposed multi-billion dollar facilities will provide employment for up to 7,000 men over a period of two to three years. Many of these will be northerners, although the number of workers needed appears to exceed the number of northerners available for employment, so some of the jobs will have to be occupied by skilled tradesmen who are not available in the north.

Arctic Gas is preparing an extensive training program so that the majority of the permanent jobs in the north and those involved in the operation and maintenance of the pipeline will go to residents of the area. In addition to these jobs a far greater number will be created in the exploration and production operations of the petroleum companies as well as in the support and service industries, for which the pipeline is a prerequisite.

The former Gas Arctic Systems Study Group, which merged in 1972 with the Northwest Project Study Group to form what is now called Arctic Gas, launched its training program late in 1970. Selected northern residents are being trained on the operating pipeline system of Alberta Gas Trunk Line Company of Calgary.

Sixteen northerners, eight Indian, three Eskimo and five whites, were initially selected for the training program. They were hired as permanent employees of AGTL and have the option of returning to the north to help operate a gas pipeline system when one is built or remaining with AGTL in Alberta. After the first year, 11 of the 16 trainees were still on the program, and an additional 16 trainees were hired last year.

The Northwest Project Study Group in 1972 retained the Boreal Institute for Northern Studies, a research institute located at the University of Alberta, Edmonton. They have completed a study designed to provide maximum employment opportunity for residents of northern Canada in the construction and operation of a pipeline system.

Based upon this prior work Arctic Gas is developing plans for a much expanded program for recruitment, training and employment of northern residents. These plans will take into consideration such factors as the economic, sociological and cultural impact of the pipeline on northern residents. The program will be tailored to meet the specific requirements and aspirations of northerners ■

1. Recruitment, training and employment of northerners has high priority in the planning and operation of Arctic Gas.
2. The Ignek Valley on the north side of Alaska's Brooks Mountains. A weathering phenomena causes this rust coloring.
3. A young arctic hare.
4. Migrating caribou appear to be largely indifferent to the presence of man or human activities.

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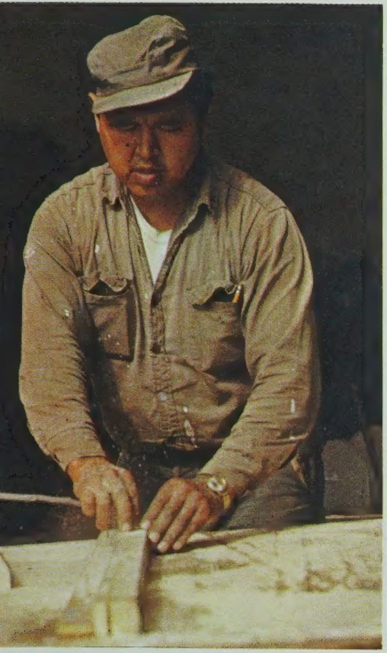

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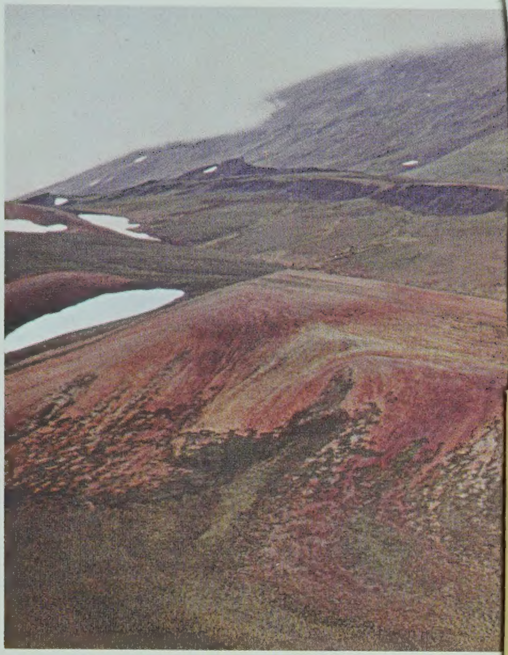

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